Attachment G
Review of the Lower Eight Miles of the Lower Passaic River
Focused Feasibility Study Report

to the Comments on behalf of the Lower Passaic River Study Area Site Cooperating Parties Group on the Proposed Plan for the Lower Eight Miles of the Lower Passaic River Study Area Portion of the Diamond Alkali Superfund Site

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Background Information

This white paper was prepared by Frank J. Belesimo, Executive Vice President of Cashman Dredging and Marine Contracting Company, LLC. Mr. Belesimo manages Cashman's dredging division and has more than 18 years of experience planning, estimating, and executing complex environmental, capital, and maintenance dredging projects, including projects within Newark Bay and contributing waterways.

Cashman Dredging was contracted by Integral Consulting Inc. to review the EPA's 2014 Focused Feasibility Study (FFS) for the Lower 8 miles of the Lower Passaic River and particularly, to review analyses and assumptions pertaining to EPA's dredge production and project duration estimates and associated references to the environmental dredging pilot study performed by Jay Cashman Inc. (Jay Cashman Inc., is an affiliate company of Cashman Dredging) in 2005. The dredging portion of the work for Alternative 3 of the FFS (described in Section 4.4.4 of the FFS) is estimated to occur for a duration of 3.9 years. The FFS assumes under Alternative 3 that dredging would occur during 40 weeks per year, six days per week, for an effective dredging season of 240 days per year at an average production rate of 4,929 cubic yards per day (FFS, Appendix F, Table 2-5).

In Section 4.2.3, Sediment Removal, First Bullet – Productivity, the FFS states:
"System productivity was evaluated using information developed during the Environmental Dredging Pilot Study (LBG, 2012) as well as operations at other large remediation dredging projects. On the basis of this evaluation, an average production rate for each of the two primary dredges has been conservatively estimated to be 2,000 cubic yards per 24-hour day. This production rate accounts for periods where a smaller secondary dredge would operate at a lower production rate around obstructions such as bridge abutments and bulkheads. Dredging was assumed to occur for 40 weeks per year to account for equipment maintenance, weather, and some degree of fish window restrictions."

In Appendix F, Section 2.4.1, Site Specific Data, the FFS states based on the Environmental Dredging Pilot Study (LBG, 2012):
"For FFS cost estimation purposes, the production rate was conservatively assumed to be 2,000 cubic yards per 24-hour day. This rate accounts for periods where a smaller secondary dredge would operate at a lower production rate around obstructions such as bridge abutments and bulkheads. Dredging was assumed to occur for 40 weeks per year to account for equipment maintenance, weather, and some degree of fish window restrictions."

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In Appendix F, Table 2-5 Reach by Reach Analysis – Impacts of Productivity, the FFS provides insight to the process in which the duration of 3.9 years is arrived. Table 2-5 details three reaches, each of a distinct portion of the Lower Passaic River (LPR) and each represented by an estimated required volume of dredging.

- The first and largest section, RM 0 – RM 4.6 contains 3.36M cubic yards of targeted material (78% of the total Alternative 3 volume), but in contrast to productivity determinations stated in in the body of the FFS, utilized a dredge production rate of 3,300 cubic yards per day per dredge.
- The second section, RM 4.6 – RM 8.1 contains 900K cubic yards of targeted material (21% of the total Alternative 3 volume) and utilizes a dredge production rate of 1,350 cubic yards per day per dredge.
- The third section, RM 8.1 – RM 8.3 contains 40K cubic yards of targeted material (1% of the total Alternative 3 volume) and utilizes a dredge production rate of 500 cubic yards per day per dredge.

Review of Environmental Dredging Pilot Study Report

The LBG 2012 report is based on a relatively small scale pilot study performed in December of 2005. The pilot study targeted +/- 4,000 cubic yards of material over an area of approximately 1.0 acre. For reference, the pilot study performed during 2009 on the GE Hudson River project included the removal of 273,000 cubic yards over an area of approximately 50 acres.

The LPR 2005 pilot study was performed utilizing a clamshell dredge (Lima 2400) equipped with a level cut bucket (8 yd^3 Cable Arm), two large hopper barges (260x52), and associated support equipment including a guide barge and a barge mounted bucket wash tank.

The volume dredged during the pilot study is reported separately as 3,707 cubic yards (Rogers Surveying, P.L.L.C) and 3,800 +/- 100 cubic yards (LBG, 2012). The total net operational hours of dredging time (NOH – net operational hours) during the Pilot Study was 24.88 hour (Figure 5-3, LBG 2012). Utilizing the volume indicated by the Rogers Surveying data and the total NOH, the average gross production during the pilot study was 149 cubic yards / NOH.

Section 5.2.2, last paragraph, states that the overall time efficiency (referred to as EWTW in LBG, 2012) experienced on the project was 60%. A review of Section 5.2.2 indicates that certain adjustments were made to the NOH and the total pilot study hours by the authors of the Report during the review of the dredging logs which increased time that was removed from the overall evaluation of dredge efficiency.

Section 5.2.2, last paragraph, states that "*The EWTW for the first two days of the Pilot Study is lower than the uptime range (55 to 70 percent) that is typical for sediment remediation projects (USACE 2008"* and continues that *"the EWTE for the remainder of the Pilot Study is higher than the typical environmental dredging range and actually resembles ranges typically seen for navigation dredging nationwide (70 to 85 percent; USACE, 2008)."* The references seem to indicate that the Pilot Study may be evidence of the potential for relatively high time efficiencies on future work on the LPR. A more complete review of the USACE 2008 report, "Technical Guidelines for Environmental Dredging of Contaminated Sediments" provides the following insight "*The EWTE for navigation dredging tends to be in the range of 70 percent to 85 percent. The EWTE for sediment remediation projects is typically less than for navigation dredging and can run in the range of 55 percent to 70 percent. The lower EWTE for sediment remediation is associated with increased non-effective time for non-production activities such as maintenance of precision navigation systems, agency inspections, water quality management, turbidity curtains, waiting for test results and/or direction from the owner/engineer, standby for the offloading and/or treatment activities, and health and safety meetings and related activities."* The detractors to time efficiency and reasonably expected delays on future LPR work are confirmed and explained in further detail in the USACE 2008

report. Additional reasons for delays specific to the LPR that are important to be included and considered for future LPR dredge projects are delays caused by debris, buried utilities, vessel traffic, and delays associated with navigating the bridges leading to the LPR worksites.

If the production rate achieved during the 2005 Pilot study is combined with the time efficiency reported in the LBG 2012 report the following daily production can be estimated:

Daily Production (yd^3/day) =Hourly Production (yd^3/NOH) x24 (hours/day) xTime Efficiency (%)
=149 (yd^3/NOH) x 24 (hours/day) x Time Efficiency (60%)
=2,146 yd^3 / day

Based on this evaluation of dredge productivity from the 2005 Pilot Study, 2,000 cubic yards per day / per dredge is supported by the dredging production data. If all of the available data collected during the Pilot Study are used in calculating the time efficiency (Table 1) a time efficiency range of 44% - 46% results (varies depending on use of data from 12/9/2005 storm event).

	Equipment Movement (hours)	Lost Time (hours)	Down Time (hours)	Client Standby (hours)	Undefined Standby (hours)	Setup Time (hours)	Operating Hours (hours)	Survey Time (hours)	Total Time (hours)	Time Efficiency (%)
12/5/2005	1.81	1.42	0.50	0.00	0.00	4.33	5.45	0.00	13.51	40.34%
12/6/2005	4.41	2.83	0.00	0.00	0.00	1.75	5.01	0.00	14.00	35.79%
12/7/2005	1.41	0.00	0.00	1.58	0.00	0.50	5.76	1.75	11.00	52.36%
12/8/2005	0.37	0.00	0.00	2.25	0.00	0.50	4.04	0.00	7.16	56.42%
12/9/2005	0.58	0.00	0.00	1.42	0.00	0.50	0.00	0.00	2.50	0.00%
12/10/2005	0.63	0.00	0.00	0.00	2.75	0.50	4.62	0.00	8.50	54.35%
Total							24.88		56.67	43.90%

	Operating Hours (hours)	Total Time (hours)	Time Efficiency (%)
Time Efficiency including all days	24.88	56.67	43.9%
Time Efficiency excluding 12/9	24.88	54.17	45.9%

Table 1 - LPR 2005 Time Efficiency Data and Calculation

If the production rate achieved during the 2005 Pilot study is combined with the time efficiency shown in Table 1 the following daily production can be estimated:

Daily Production (yd^3/day) =Hourly Production (yd^3/NOH) x24 (hours/day) xTime Efficiency (%)
=149 (yd^3/NOH) x 24 (hours/day) x Time Efficiency (46%)
=1,645 yd^3 / day

General Comments and Conclusions

The Focused Feasibility Study seemed to rely heavily on the data presented in the Environmental Dredging Pilot Study Report (LBG, 2012) as evidenced by statements presented in Section 4.2.3 and Appendix F Section 2.4.1. Upon review of the LBG 2012 Report, it was difficult to associate the time efficiency figure of 60% with the actual data present in either the Report or the dredging logs presented by the contractor (Jay Cashman, Inc., affiliate company of Cashman Dredging). Upon evaluation of the data present in either the Report or the dredging logs, a time efficiency figure of approximately 45% appears to more closely reflect the time efficiency experienced on the

2005 pilot study. Based on the small data set produced by the 2005 Pilot the LBG 2012 Report inference of a 60% time efficiency may indicate an aggressive position based solely on the available data.

The LBG 2012 Report makes reference to a USACE 2008 report "Technical Guidelines for Environmental Dredging of Contaminated Sediments", in which it appears to suggest or indicate that the Pilot Study may be evidence of the potential for relatively high time efficiencies on future work on the LPR. Additional data should be collected in order to make a site specific estimate of potential dredge efficiency and should include, but should not be limited to the following (in no particular order) probable impacts:

- maintenance of precision navigation systems (i.e. periodic bucket calibration confirmation)
- agency inspections
- water quality management and testing
- turbidity curtains
- waiting for test results and /or direction from the owner / engineer / agency
- standby for the offloading and/or treatment activities (i.e. waiting on the return of light barges from processing)
- health and safety meetings and related activities (i.e. daily toolbox meetings, periodic training)
- delays caused by traffic
- delays associated with navigating the bridges leading to the LPR worksites

Of the impacts described above the following cannot be understated as potential sources of significant delay: waiting for test results and / or direction from the owner / engineer / agency, delay time caused by waiting on the return of light barges from processing, and delay time associated with navigating the bridges leading to the LPR worksites. Each of these delays will be specific to the LPR remediation effort and may not be similar in nature to other large Superfund dredging projects.

Appendix F Table 2-5 presents an anticipated daily production rate of 3,300 cubic yards per day per dredge for the reach between RM 0 – RM 4.6. Data or calculations supporting this production rate is not evident in either the FFS or the LBG 2012 Report. As stated previously, Section 4.2.3 and Appendix F Section 2.4.1 indicate a production rate of approximately 2,000 cubic yards per dredge per day is supported by the data. Although the data presented in the FFS are not sufficiently detailed with respect to the 3,300 cubic yards per day production rate, a reasonable assumption is that EPA's production rate assumption was based in part on production rates experienced on navigation maintenance dredging projects performed in New York Harbor or Newark Bay. In the absence of a detailed explanation or rationale, reference, or data that might delineate superfund material and navigation dredging material in this reach, such an assumption may be significantly optimistic.

Appendix F Table 2-5 presents the Alternative 3 dredging volume of 4.3 million cubic yards. A review of the FFS and associated appendices did not provide evidence of the calculations that were used to arrive at this total volume figure. Section 2.1 (Doc in Shoal Areas) of the FFS states *"To account for dredging inaccuracies (i.e., overdredge allowance); six inches were added for estimated depths of fifteen feet or less and one foot was added for depths greater than fifteen feet."* However a detailed explanation or analysis of these areas and the associated overdredge allowance volumes vs. the targeted volumes is not evident in the FFS. The absence of the calculations and assumptions that support the targeted volume, its associated areas (horizontal extents), and the anticipated overdredge allowance introduces uncertainty in the overall volume estimate.

A detailed review of the FFS and supporting documentation indicate a general lack of data and supporting calculations that validate the conclusions presented in the FFS with respect to production rates that are using to calculate the overall dredging duration. Between both of the LBG, 2012 Report and sections of the FFS (Section 4.2.3 and Appendix F Section 2.4.1) to Appendix F Table 2-5, there is an unsubstantiated increase in daily production rate of more than 1,000 cubic yards per day per dredge. A transparent and detailed analysis of the

dredge areas, targeted dredge volumes, and anticipated overdredge allowance volumes should be presented in order to reasonably develop and support anticipated production rates, overall dredging and processing time efficiency, impacts associated with testing and monitoring of the project, and delays associated with transiting the LPR (and associated bridge openings). A complete analysis of all of this interrelated data is required to determine the duration of the dredging efforts for Alternative 3 presented in the FFS. The analysis, comments, and conclusions presented herein present a high level of uncertainty regarding the production rate assumed in Table 2-5, the time efficiency that can be applied to future LPR dredging efforts, and the constituent factors of the total assumed removal volume.

References

LBG, 2012. Environmental Dredging Pilot Study Report. Prepared for USACE New York District. LBG, Inc., Elmsford, NY, July 2012.

USACE. 2008. "Technical Guidelines for Environmental Dredging of Contaminated Sediments." Engineer Research and Development Center – Environmental Laboratory. Prepared for USEPA. September 2008.

USACE, 2010. "Lower Passaic River Commercial Navigation Analysis." Prepared by the United States Army Corps of Engineers New York District. Revision 2.

USEPA, 2014a. "Lower Eight Miles of the Lower Passaic River, Focused Feasibility Study Report." Prepared by The Louis Berger Group for the U.S. Environmental Protection Agency, Region 2 and USACE, Kansas City District, 2014.

USEPA, 2014b. "Lower Eight Miles of the Lower Passaic River, Remedial Investigation Report for the Focused Feasibility Study." Prepared by The Louis Berger Group for the U.S. Environmental Protection Agency, Region 2 and USACE, Kansas City District, 2014.

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SENIOR VICE PRESIDENT

PROFESSIONAL PROFILE

- Senior Vice President with more than 15 years of experience with projects ranging from the most Complex Environmental Cleanups to $167 million Capital Dredging Projects
- Strong leader with motivational management style and reputation for training and retaining highly motivated project teams
- Results-oriented achiever with excellent track record for managing complex projects

PROFESSIONAL EXPERIENCE

Senior Vice President, Cashman Dredging and Marine Contracting Company LLC, March 2007 – Present
Managed Dredging Division of Cashman
Ensured Operational and Financial Success of the Dredging Division
Developed Management and Staff within Dredging Division

Project Manager, Bean Stuyvesant, May 2000 – March 2007

- Planned and implemented large scale capital dredging and environmental projects
- Ensured compliance with NY State DEC and State of NJ DEP Water Quality Certifications with regards to the dredging and transportation of contaminated material from the Kill Van Kull Navigation Channel and Newark Bay
- Planned, coordinated, and managed subcontractor operations
- Developed strong working relationships with clients to ensure accurate communication and execution
- Managed staff and labor of up to 160 union and non-union employees on dredges, land based treatment operations, tug boats, drilling and blasting pontoons, and office staff

Engineering Consultant, C.F. Bean and Bean Stuyvesant, September 1998 – May 2000

- Developed a method to calculate material quantity by soil classification
- Produced area and volume workups from printed and electronic plans
- Produced reports defining the quantity, type, and location of required material

Project Engineer / Field Engineer, C.F. Bean Corporation, June 1996 – August 1998

- Provided a means of communication between the project and operation teams
- Calculated all figures regarding dredging quantities
- Produced daily quality control, safety, and production reports for client and company management
- Coordinated and performed detailed hydrographic and land surveys
- Developed method to effectively use Microstation and InXpress for quantity calculations

EDUCATION/CERTIFICATIONS

- **Master of Science in Ocean Engineering**, Texas A&M University, College Station, TX, 2000
  Masters Thesis Topic - Cost Estimating Projects for Large Cutter and Hopper Dredges
- **Bachelor of Science in Ocean Engineering**, Texas A&M University, College Station, TX, 1996
  Member of the Corps of Cadets at Texas A&M

- Financial Reporting for Non-Financial Managers, Duke University, Durham, NC, 2005
- Basic Blast Design, with Dr. Calvin Konya, Project Site, NY, 2003
- Construction Quality Management for Contractors Certificate, USACE NY District, NY, 2001
- General Dredging Course, Training Institute for Dredging, Kinderdijk, The Netherlands, 1999
- OSHA 40 Hour Hazardous Waste Operations and Emergency Response Training (HAZWOPER)

- OSHA 8 Hour Supervisor
- First Aid/CPR
- Defensive Driving
- Start Training (GE)

RELEVANT PROJECT EXPERIENCE

- **Project: Contract 42A , Dredging Operations, GE Hudson River 2012 Season (May 2012 – Present)**
  Owner: General Electric
  Value: Confidential
  Position: Project Director
  Responsibilities: Oversight of the overall project scope including; Managing Cashman Staff of Safety, Project, Quality Control, and Environmental Managers, Client Relations with both the Owner and Construction Manager
  Highlights: Third Phase of the Largest Environmental Dredging Project in U.S. history. Dredging of PCB contaminated materials from the Hudson River while maintaining strict Quality of Life and Environmental Standards.

- **Project: Newark Bay and Arthur Kill Channels, S-AK-2 (4th Quarter 2011 – Present)**
  Owner: USACE
  Value: 84 million
  Position: Project Executive and Joint Venture Board Member
  Responsibilities: Oversight of the overall project scope including; Managing the Project Team with regards to planning, financial analysis, Client Relations, and Port user and US Coast Guard interface
  Highlights: 3.5 million square feet of Drilling and Blasting, Mechanical Dredging of 1 million cubic yards of Blasted Rock and 400,000 cubic yards of Glacial Till, Sand, and Clay. Dredging of 400,000 cubic yards of Contaminated Materials which will be Processed and Disposed at an Upland Facility.

- **Project: Contract 40, Dredging Operations, GE Hudson River Phase 2 (2011)**
  Owner: General Electric
  Value: Confidential
  Position: Project Director
  Responsibilities: Oversight of the overall project scope including; Maintained Public Quality of Life Standards during Dredging Activities, Managing Multiple Simultaneous Dredging Operations, Maintaining Labor Relations with Multiple Unions, Planning and Execution of Complex Dredging Strategies, Client Relations with both the Owner and Construction Manager
  Highlights: Second Phase of the Largest Environmental Dredging Project in U.S. history. Dredging of PCB contaminated materials from the Hudson River while maintaining strict Quality of Life and Environmental Standards

- **Project: Newark Bay and Arthur Kill Channels, Contract 11, S-NB-2/S-AK-1 (1st Quarter 2011 – Present)**
  Owner: USACE
  Value: 110 million
  Position: Project Executive and Joint Venture Board Member
  Responsibilities: Oversight of the overall project scope including; Managing the Project Team with regards to planning, financial analysis, Client Relations, and Port user and US Coast Guard interface
  Highlights: 2.1 million square feet of Drilling and Blasting, Mechanical Dredging of 1 million cubic yards of Blasted Rock and 2,000,000 cubic yards of Glacial Till, Sand, and Clay. Dredged 350,000 cubic yards of Contaminated Materials which were Processed and Disposed at an Upland Facility.

- **Project: Contract 4, Dredging Operations, GE Hudson River Phase 1 (2009)**
  Owner: General Electric
  Value: Confidential
  Position: Project Director
  Responsibilities: Oversight of the overall project scope including; Maintained Public Quality of Life Standards during Dredging Activities, Managing Multiple Simultaneous Dredging Operations, Maintaining Labor Relations with Multiple Unions, Planning and Execution of Complex Dredging Strategies, Client Relations with both the Owner and Construction Manager

Highlights: First Phase of the Largest Environmental Dredging Project in U.S. history. Dredging of PCB contaminated materials from the Hudson River while maintaining strict Quality of Life and Environmental Standards.

- **Project: S-Kill Van Kull Channel Deepening - 2, Newark Bay, NJ (2004 – 2007)**
  Owner: USACE
  Value: 78 million
  Position: Project Manager
  Responsibilities: Execution of the overall project scope including; Administration of Project Safety, Client Relations, Staffing, Financial Reporting, Contract Modifications, Problem Recognition and Resolution. Successfully Maintained Public Quality of Life Standards during Drilling, Blasting, and Construction Activities
  Highlights: 4.8 million square feet of Drilling and Blasting, Mechanical Dredging of 1 million cubic yards of Blasted Rock and 600,000 cubic yards of Glacial Till, Sand, and Clay. Dredged 65,000 cubic yards of Contaminated Materials which were Processed and Disposed at an Upland Facility. Managed up to 90 union and non-union employees.

- **Project: Kill Van Kull Channel Deepening - 5, Newark Bay, NJ and PA NY/NJ (2002 – 2004)**
  Owner: USACE and Port Authority of New York and New Jersey
  Value: 167 million
  Position: Project Manager
  Responsibilities: Execution of the overall project scope including; Administration of Project Safety, Client Relations, Staffing, Financial Reporting, Contract Modifications, Problem Recognition and Resolution Successfully Maintained Public Quality of Life Standards during Drilling, Blasting, and Construction Activities
  Highlights: 5.6 million square feet of Drilling and Blasting, Mechanical Dredging of 620,000 cubic yards of Blasted Rock and 1 million cubic yards of Glacial Till, Sand, and Clay. Dredged 96,000 cubic yards of Contaminated Materials which were Processed and Disposed at an Upland Facility. Managed up to 160 union and non-union employees.

- **Project: Kill Van Kull Channel Deepening - 6, Newark Bay, NJ (2001 – 2002)**
  Owner: USACE
  Value: 31 million
  Position: Project Manager
  Responsibilities: Execution of the overall project scope including; Administration of Project Safety, Client Relations, Staffing, Financial Reporting, Contract Modifications, Problem Recognition and Resolution Successfully Maintained Public Quality of Life Standards specific to noise
  Highlights: Mechanical Dredging of 44,000 cubic yards of Rock and 2 million cubic yards of Glacial Till, Sand, and Clay. Managed up to 50 union and non-union employees.

- **Project: Kill Van Kull Channel Deepening - 2, Newark Bay, NJ (2000 – 2001)**
  Owner: USACE
  Value: 14 million
  Position: Project Manager
  Responsibilities: Execution of the overall project scope including; Administration of Project Safety, Client Relations, Staffing, Financial Reporting, Contract Modifications, Problem Recognition and Resolution Successfully Maintained Public Quality of Life Standards specific to noise
  Highlights: Mechanical Dredging of 30,000 cubic yards of Rock and 1.2 million cubic yards of Glacial Till, Sand, and Clay. Managed up to 40 union and non-union employees.

- **Project: Spent Bauxite Lake Environmental Remediation (2000)**
  Owner: Kaiser Aluminum
  Value: 3.2 million
  Position: Project Manager
  Responsibilities: Execution of the overall project scope including; Administration of Project Safety, Client Relations, Staffing, Financial Reporting, Contract Modifications, Problem Recognition and Resolution Maintained Quality of Life Standards specific to noise
  Highlights: Complex Environmental Remediation Project consisting of Hydraulically Dredging 350,000 cubic yards of Spent Bauxite. Disposal at a Confined Disposal Facility 10 miles from the project site, and a pipeline that was completely buried except for both ends. Managed up to 30 employees.